

Abstract

An analog electronic building block for the design of electronic circuits leading to new topologies for amplifiers, cascoding, buffers, regulators and digital circuits. The new building block has 4 terminals. The device uses the synergy that comes from connecting two like polarity transistors in a certain way. The device uses two transistors connected with the collector of a first transistor (Q1) connected to the base/gate of a second transistor (Q2) and the base of the first transistor connected to the emitter/source of the second transistor. The device opens up a whole new range of operation because the control exerted by the device is dictated by two of the four terminals and control is shared and passed from one to the other of the two terminals depending of the impedances of the input signals. These two terminals are the emitter of the first transistor and the base of the first transistor, which is, as noted, connected to the emitter/source of the second transistor. These two terminals can also act as outputs of the device depending on the exterior configuration and impedances. The device takes advantage of the inherent strengths of the bipolar transistor. The device forces the bipolar transistor to operate in the current domain and not the voltage domain as is generally done. The device also allows for increased control of MOSFET transistors. This complex interaction and synergy give rise to greater power of design and leads to new advanced topologies for amplifiers, buffers, cascoding applications, regulators and even digital circuits.